

Description Definition Language

Tutorial

Claude Seyrat

The XML Context

Flat documents – a letter example

Mr Robert Smith
15 rue Lacepede
75005 Paris

Dear Mr Doe,

- Spatial organization of the document and your knowledge helps you:
 - This is an address
 - This is the sender name
 - This is a letter header

Flat documents

Mr Robert Smith
15 rue Lacey
pede 75005 Paris
Dear Mr
Doe,

???
?

- However a computer will not be able to easily detect this information
- Idea : tag document items

Structured documents

- Formating, searching is made in accordance with a data structure
- Structure is important
 - Explicit the structure
 - I.e. make it available to an application without prior knowledge

Reification of structure

<**name**>Mr Robert Smith</**name**> 15 rue
Lacepede 75005 Paris Dear Mr Doe,.....

- This is a name

Reification of structure

<**namename**>

<**addressaddress**>

Dear Mr Doe,

- This is an address

Reification of structure

```
<name>Mr Robert Smith</name>
<address>15 rue Lacepede 75005 Paris</address>
<text>Dear Mr Doe,..... </text>
```

- This is plain text

Reification of structure

```
<name>Mr Robert Smith</name>
<address>15 rue Lacepede 75005 Paris</address>
<text>Dear Mr Doe,..... </text>
```

- Is it structured enough?

Reification of structure

<**header**>

 <**name**>Mr Robert Smith</**name**>

 <**address**>15 rue Lacepede 75005 Paris</**address**>

</**header**>

<**text**>Dear Mr Doe, </**text**>

- This is a header !

-

Reification of structure

```
<letter>
  <header>
    <name>Mr Robert Smith</name>
    <address>
      <street>15 rue Lacedepe</street>
      <city>Paris</city>
    </address>
  </header>

  <text>Dear Mr Doe, . . . . </text>
</letter>
```

From structured documents To structured descriptions

- A document like a letter is one kind of data
- These rules work for any kind of **structured data**
- In MPEG-7,
 - **structured metadata**
 - **Or structured descriptions**
- Tools are the same (XML)

More formally

- Elements

- <city> ... </city>
- Are containers of information
- Contains data or other elements

- Attributes

- <city continent=«Africa»> ... </city>
- Attribute-value pairs used to characterize elements

Notion of well-formedness

- A document is well formed if
- i.e the XML document is correctly written

```
<a>  
<b>  
</b>  
</a>
```

OK

```
<a>  
<b>  
</a>  
</b>
```

Not well formed

XML document are trees

Structured documents are trees

```
<letter>
  <header>
    <name>Mr Robert Smith</name>
    <address>
      <street>15 rue Lacepede</street>
      <city>Paris</city>
    </address>
  </header>

  <text>Dear Mr Doe, ..... </text>
</letter>
```

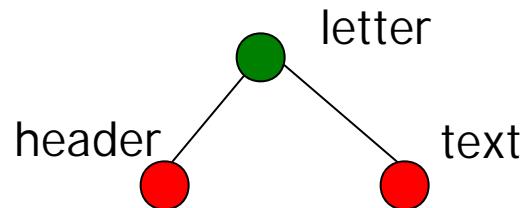


letter

Structured documents are trees

```
<letter>
  <header>
    <name>Mr Robert Smith</name>
    <address>
      <street>15 rue Lacedepe</street>
      <city>Paris</city>
    </address>
  </header>

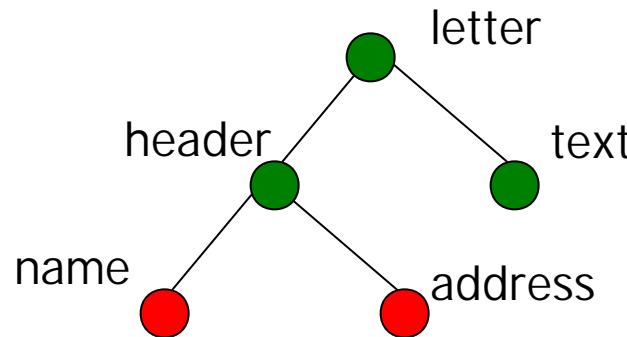
  <text>Dear Mr Doe, ..... </text>
</letter>
```



Structured documents are trees

```
<letter>
  <header>
    <name>Mr Robert Smith</name>
    <address>
      <street>15 rue Lacedepede</street>
      <city>Paris</city>
    </address>
  </header>

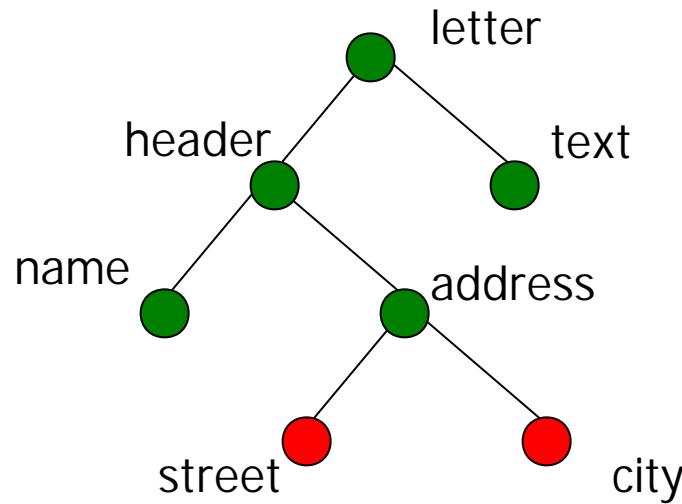
  <text>Dear Mr Doe, ..... </text>
</letter>
```



Structured documents are trees

```
<letter>
  <header>
    <name>Mr Robert Smith</name>
    <address>
      <street>15 rue Lacedepede</street>
      <city>Paris</city>
    </address>
  </header>

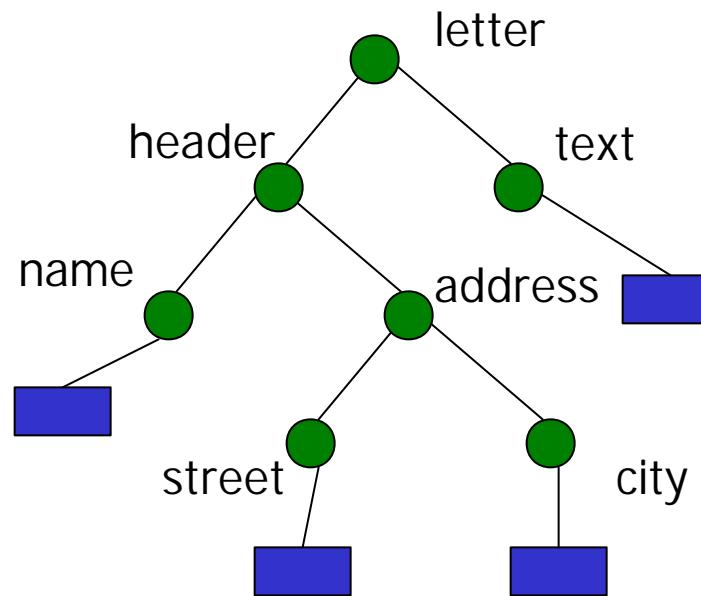
  <text>Dear Mr Doe, ..... </text>
</letter>
```



Structured documents are trees

```
<letter>
  <header>
    <name>Mr Robert Smith</name>
    <address>
      <street>15 rue Lacedepede</street>
      <city>Paris</city>
    </address>
  </header>

  <text>Dear Mr Doe, ..... </text>
</letter>
```



Example: A description of a video

```
<Mpeg7Main>

    <DescriptionMetadata>
        <Version>1.0</Version>
    </DescriptionMetadata>

    <ContentDescription>
        <AudioVisualContent xsi:type="VideoType">
            <Video>
                <CreationInformation>
                    <Creation>
                        <Title> Soccer goal score </Title>
                    </Creation>
                </CreationInformation>
            </Video>

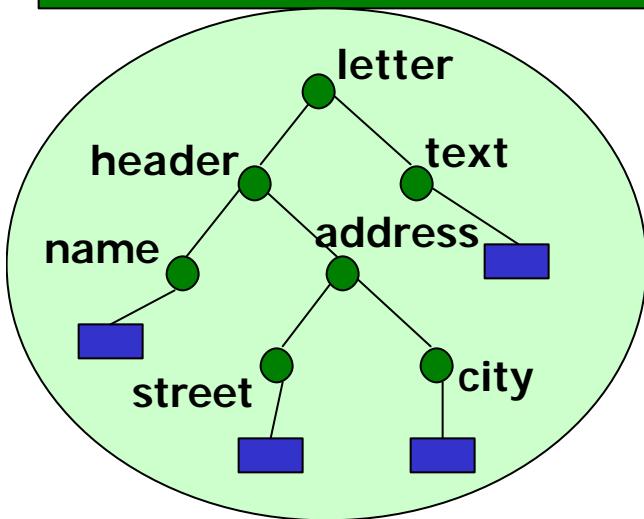
            <Audio> ..... </Audio>

        </AudioVisualContent>
    </ContentDescription>
</Mpeg7Main>
```

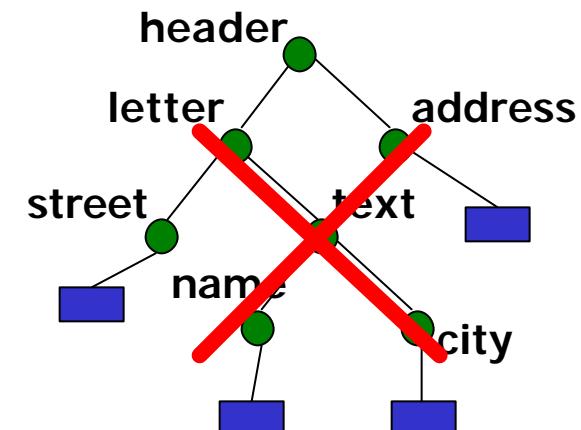
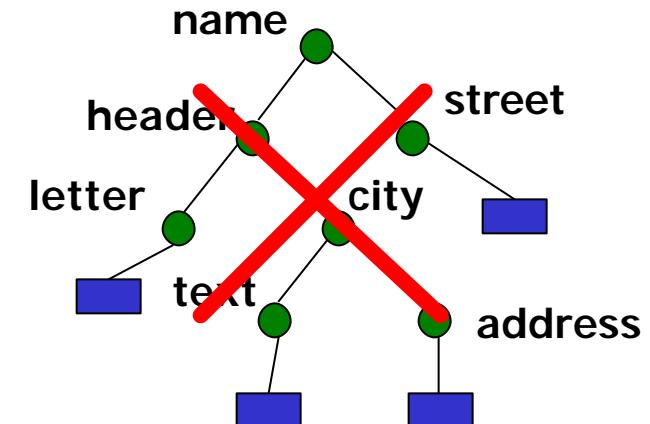
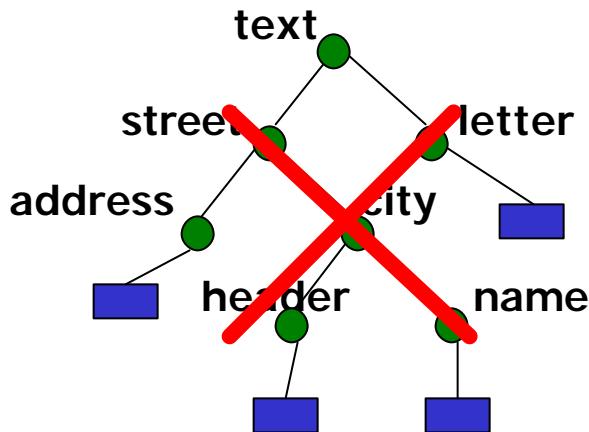
XML Schema and the DDL

Back to the « letter » example

What is a valid « letter » document ?

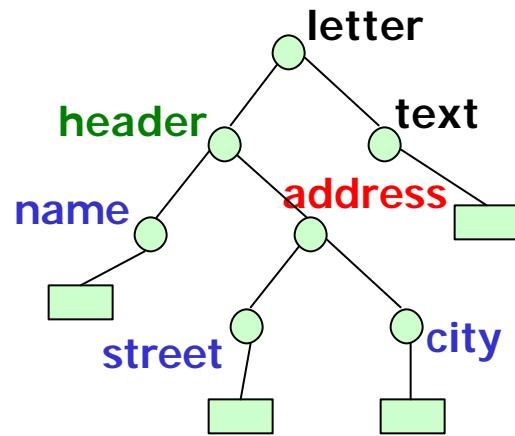


?



EXPWAY

Rules for a valid letter



- A **letter** contains an **header** and some **text**
- An **header** contains a **name** and an **address**
- An **address** contains a **street** and a **city**
- ...

The DDL is...

...the language to express what is a valid description

- Used to write a set of formal rules about:
 - Ordering of elements
 - Occurrences of elements
 - Right nesting
 - Nature of the data
- schema of the document
- XML Schema (W3C) + extensions

A simple schema for letter

element

letter

A simple schema for letter

element letter

sequence

element header

element text string

A simple schema for letter

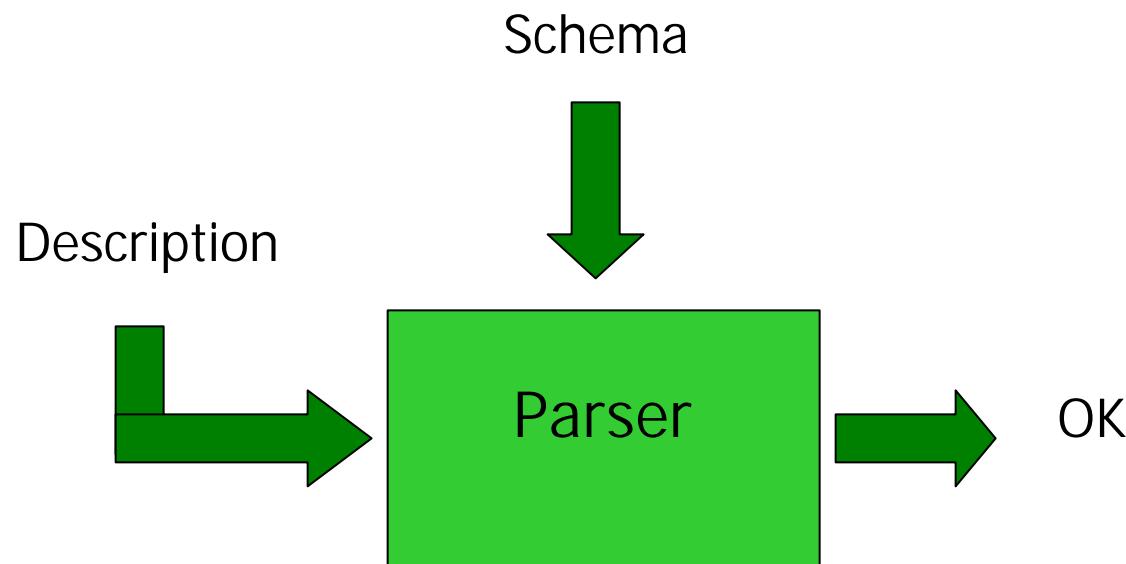
```
element      letter  
  
sequence  
element      header  
  
sequence  
element      name      string  
element      address    string  
  
element      text       string
```

A simple schema for letter

```
<element name="letter">
  <complexType>
    <sequence>
      <element name="header">
        <complexType>
          <sequence>
            <element name="name" type="string"/>
            <element name="address" type="string"/>
          </sequence>
        </complexType>
      </element>
      <element name="text" type="string"/>
    </sequence>
  </complexType>
</element>
```

A DDL parser is...

...the software used to check if a description is valid

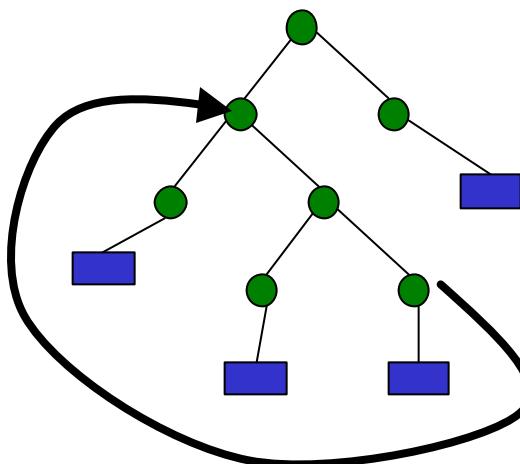
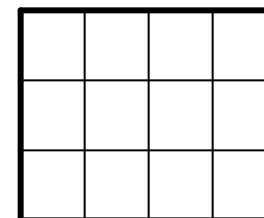


DDL extensions

MPEG-7 structural extensions

- Specific constructs:

- For matrices
- For linking parts of a description



MPEG-7 datatype extensions

- Mime
- countryCode, regionCode, currencyCode
- characterSetCode
- basicTimePoint, basicDuration

The DDL in MPEG-7

The DDL is used to define...

...the data model of descriptions

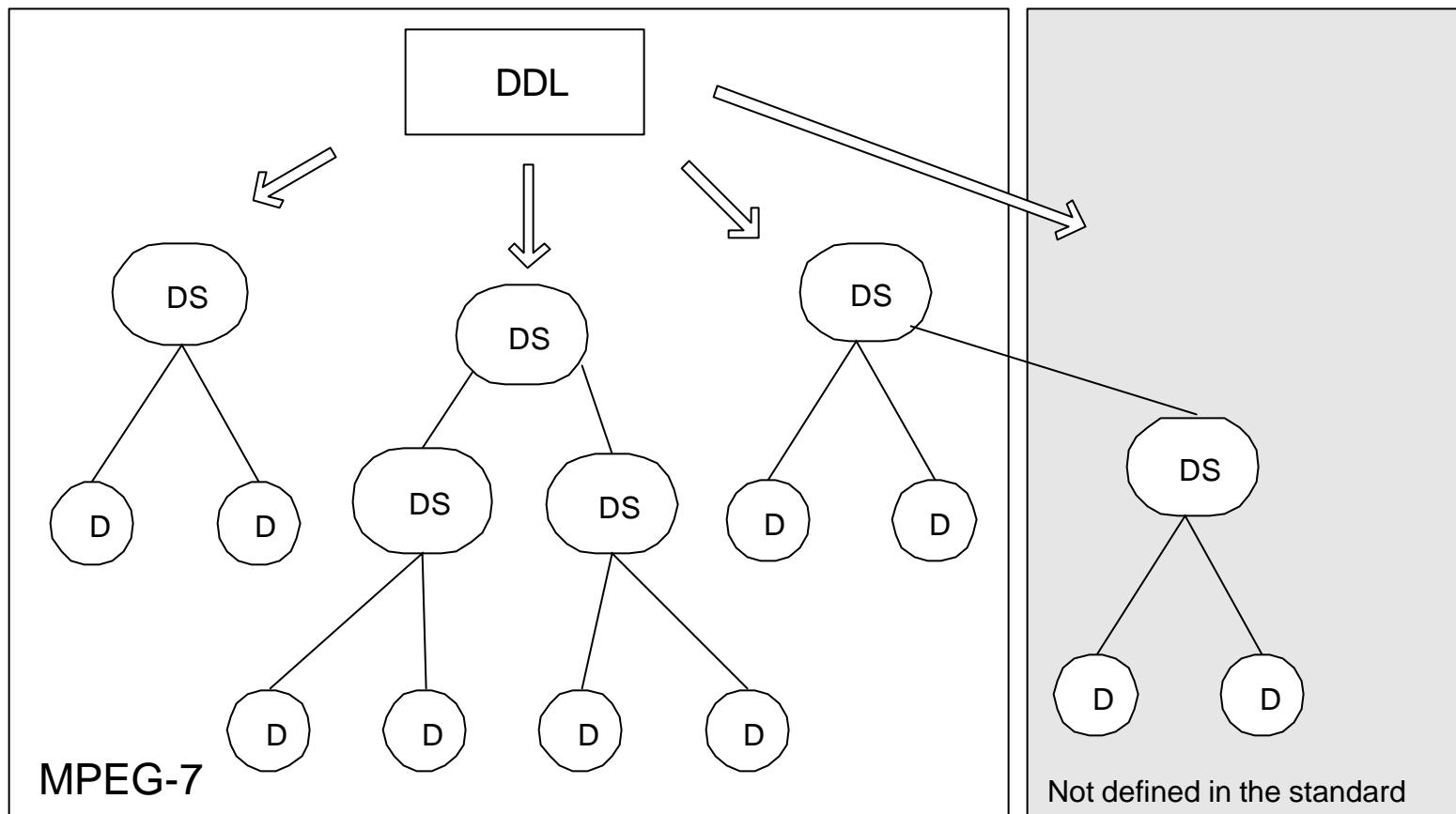
- Types of structured description
- Types of data (string, integer, real, aso,...)
- Hierarchies of types
- Default values

- Basic semantics (time, duration, ..)

The DDL allows...

- To extend MPEG-7 for specific purpose
- Tools :
 - Importing
 - Extension
 - Restriction
 - Redefinition

The DDL For MPEG-7 and beyond



Conclusion

- The DDL
 - is XML-oriented
 - extends XML Schema (W3C)
 - is used to define MPEG-7 datamodels
 - can be used to extend MPEG-7 if needed

More details

- Document
 - MPEG-7 DDL FCD
- DDL web site
 - <http://www.dstc.edu.au/mpeg7ddl>
- Contact
 - ▶ Claude.seyrat@expway.fr